varying in diameter from 2 to 10 micro-millimetres, usually in several layers, other endophyllic hyphæ penetrating from them into the root between the epidermal cells, these being still slenderer than those of the envelope. By this structure, the formation by the tree of root-hairs is entirely prevented, and it is through it alone that nutriment is absorbed out of the soil. It makes its appearance first on lateral roots of the young seedling, and is constantly being replaced by fresh formations on older roots. Dr. Frank found this Mycorhiza invariably present on every root examined of trees belonging to the Cupuliferæ, also occasionally on Salicaceæ and Coniferæ, but not on woody plants belonging to other natural orders, nor on any herbaceous plant. He also regards the phenomenon as an example of symbiosis, comparable in all essential points to that of lichens, the Mycorhiza corresponding to the fungal element, the tree itself to the algal gonidia. Dr. Woronin confirms these statements in relation to Coniferæ, Salicaceæ, and some other trees, and thinks it probable that the fungus is the mycelium of a *Boletus*. He regards it, however, as truly parasitic.

In the discussion which took place at Strassburg, Dr. Frank stated that the fact of this phenomenon having been observed especially in the Cupuliferæ, was probably due to the partiality of these trees for soil rich in humus. He had observed it also in the Abietineæ among Coniferæ, the Salicaceæ, the alder and birch among Betulaceæ, and in one instance each in the lime and blackthorn. He regards it as probably much more widely diffused than previous observations had suggested. Prof. de Bary, who accepts the explanation of the phenomenon as an example of symbiosis, pointed out that a similar relationship has long been known between Orchideæ and fungus hyphæ. Observations in the same direction have also been made by Riess and Janczewski. ALFRED W. BENNETT

NORWEGIAN TOADSTOOLS

AMONG the various interesting facts regarding the history of cryptogamic plants given in the new edition of Prof. Schübeler's great work on the flora of Norway, special interest attaches to the results of his experiments on *Amanita muscaria*, one of the commonest of the Norwegian toadstools. According to Dr. Schübeler, we have in this mushroom the source whence the ancient Scandinavians derived a preparation whose intoxicating and half poisonous properties induced symptoms of frenzied excitement, similar in all respects to those exhibited by the old northern warriors when taking part in a "Berserksgang," which appears to have been very similar to the so-called "running amok." Prof. Schübeler founds his opinion on the evidence given by the Russian writers, Krascheninnikow, Erman, and others, as to the effects produced on the Kamchatkans by a decoction of the Amanita, which they used as an intoxicating drink until they were brought into closer contact with the Russians, from whom they have acquired the practice of drinking spirits. In the present day this use of the Amanita seems to be limited to the nomadic Korjakes, with whom the neighbouring Kamchatkan tribes carry on a profitable trade, giving only one or two of these mushrooms in exchange for a reindeer. According to the testimony of the Kamchatkans, the first symptom noticed after drinking this so-called "Muchamór liqueur," one of whose ingredients is said to be the juice of *Epilobium angustifolium*, is a trembling in the limbs, followed after a time by great flushing of the face and general excitement and irritability, which in the case of many is accompanied with an abnormal increase of muscular force. Thus an instance is recorded in which a man while under the influence of this stimulant ran 15 versts carrying a sack of flour on his back weighing 120 lbs., which in his ordinary condition he could barely lift. On comparing the symptoms of intoxication by muchamor recorded among the nomads of North-Eastern Asia with the accounts given by Icelandic and other northern authorities of the condition of the Berserkers in their frenzy, Dr. Schübeler finds such complete harmony that there can be no doubt of the identity of the causes to which both may be referred. We know, moreover, that while the descriptions of the Berserkergang forcibly recall the frenzy induced by the use of hachish, or opium, neither of these stimulants could have been attainable in Iceland in ancient times, nor could brandy have been used by the northmen, since it was not introduced into Norway before 1531. The employment of mead or ale by the Bersekers is equally negatived by the symptoms recorded, which the writer seems to have traced beyond a doubt to their true source. It is worthy of notice that as early as the beginning of the eleventh century the law-givers of Iceland recognised the Berserkergang as a manifestation of frenzy, for which the actors were to be held accountable, while a law was introduced in 1123 which ordained that every man who took part in these outbreaks should be banished from the island for three years, and that a similar punishment should be awarded to all who were present and who did not help to bind the Berserkers and watch over them till their excitement had passed away.

SCIENTIFIC SERIALS

Bulletin de l'Académie royale de Belgique, October 10.—Note on the crepuscular lights observed towards the end of the year 1883, by M. Hirn. A new explanation is here suggested of this phenomenon, which is attributed to a highly electric condition of the upper atmospheric layers in combination with particles of matter floating round the globe, and possibly due to the Krakatoa eruption.—On the notion of force in modern science, by M. Hirn. In this essay force is removed from the almost mystic domain it has hitherto occupied, and brought within the sphere of actual experience. The question to be determined by science is, whether gravitation, electricity, heat, &c., are to be regarded as distinct entities, or different forms of the same element absolutely distinct from what we call ponderable matter. But owing to the prevailing confusion regarding the nature of force, it is better for the present to study its various dynamic manifestations, than to attempt to reduce them to one element.—Analysis of some rocks from the "rivers of stone" in the Falkland Islands, by A. Renard. Amongst these specimens is a square prism with regular polyhedric breakage showing a granitoid texture, and altogether typical of the eruptive masses frequently interspersed amongst Palæozoic formations like those of the Falkland Islands. This fragment must be classed in the group of diabase rocks, and may serve to throw some light on the origin of the remarkable "rivers of stone" described by Darwin and Wyville Thomson.—Note on the gemmation of the channels in the planet Mars, by F. Terby. It is suggested that this curious phenomenon may be the beginning of a periodical enlargement of the channels due to causes for which no analogy can be found on the terrestrial globe.—The ancient geography of Western Asia elucidated by means of the cuneiform inscriptions, by M. Delattre. By a careful study of the itineraries and warlike expeditions described in the Assyrian and Babylonian records the author endeavours to determine the position of numerous localities unknown to the Greek and Latin writers.—The origin of the Flemish people, by L. Vanderkinden. In reply to M. Wauters' recent memoir, the author shows conclusively that the Saxon and Frisian elements are largely represented in the present populations especially of Western Flanders.

Rivista Scientifico-Industriale, October 31.—Paramagnetism and diamagnetism, by Prof. Carlo Marangoni.—On the velocity of the rays polarised round the interior of a body endowed with rotatory power, by Prof. Augusto Righi.—Experiments on the heating of boilers with petroleum, by the editor.—On the native arsenic of the Valtellona district, by D. Bizzari and G. Campani.

Rendiconti del Reale Istituto Lombardo, November 12.—Critical and exegetic essays on the sources of Roman jurisprudence, by Prof. C. Ferrini.—Theoretical treatment of the question of the ventilation of rooms, showing that in all cases the ventilating apparatus should be placed above, by Prof. R. Ferrini.—On a question of priority of discovery in bacterio-therapeutics, by E. L. Maggi.—Analytical functions of a single variant with any number of periods, by E. F. Casorati.—Meteorological observations made at the Brera Observatory, Milan, during the months of August and September.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, December 17.—"An Experimental Investigation into the Form of the Wave-Surface of Quartz," by James C. McConnel, B.A. Communicated by R. T. Glazebrook, M.A., F.R.S.

The paper contains an account of a number of measurements of the well-known "dark rings" of quartz. Each ring is due to one wave being retarded in the quartz behind the other by an integral number of wave-lengths, so the measurements give the directions through the plate of quartz corresponding to a series of known retardations. The relative retardation is, especially in a crystal of weak double-refracting power like quartz, mainly dependent on the distance between the two sheets of the wave-surface. Thus my observations really give the separation between the two sheets at various points, and it is in this separation that the peculiarities of quartz are most strongly marked, and the various expressions put forward by theory most widely divergent.

I found it convenient to treat separately the region near the axis, where the abnormal form of the wave-surface of quartz is most obvious. I have compared my results with nine different theories, each of which gives an expression of one of the two following forms:—

$$D^2 = P_1{}^2 \sin^4\phi + D_0{}^2.$$
$$D^2 = P_2{}^2 \sin^4\phi + D_0{}^2 \cos^4\phi$$

Here D is "the number of wave-lengths by which one wave lags behind the other in air, after the light has traversed normally a plate of quartz 1 millimetre thick, the normal to whose faces makes an angle ϕ with the optic axis." D_0 is the value of D when $\phi = 0$, and is known from the rotatory power, and P_1 and P_2 are constants to which the theories assign different values. By inserting the observed values of D and ϕ, I obtained a value of P_1 and P_2 from each ring. The results from one plate about 20 millimetres thick were as follows:—

ϕ ...	4° 24′	5° 51½′	6° 51½′	7° 40½′	8° 23½′	9° 38′	11° 41′
P_1 ...	15·054	15·207	15·220	15·260	15·249	15·258	15·269
P_2 ...	15·220	15·293	15·290	15·311	15·295	15·292	15·292

Similar results were obtained from a second plate about 27 millimetres thick.

From these figures I concluded that the second expression was the correct one, and that $P_2 = 15{\cdot}30 \pm 01$. There is a considerable discrepancy in the case of the first ring, of which two possible explanations are given in the paper.

Cauchy gives $P_2 = \frac{a-b}{a^2\lambda} = 15{\cdot}351$, where a and b are the wave-velocities perpendicular to the optic axis.

$$\text{Lommel gives } P_2 = \frac{1-a^2}{1-b^2}\,\frac{a+b}{2a}\,\frac{a-b}{a^2\lambda} = 15{\cdot}178.$$
$$\text{Kettler} \quad ,, \quad P_2 = \frac{a+b}{2b}\,\frac{a-b}{a^2\lambda} = 15{\cdot}486.$$
$$\text{Sarrau} \quad ,, \quad P_2 = \frac{a+b}{2a}\,\frac{a-b}{a^2\lambda} = 15{\cdot}306.$$

The other five, MacCullagh, Clebsch, Lang, Boussinesq, and Voigt, have the first form of expression giving

$$P_1 = \frac{a+b}{2a}\,\frac{a-b}{a^2\lambda} = 15{\cdot}306.$$

Thus Sarrau alone succeeds in explaining the observations satisfactorily.

For the larger values of ϕ I calculated on Sarrau's theory what values of $a-b$ were required to give the retardation observed in each ring, and obtained as follows:—

ϕ	15° 14′	18° 21′	23° 16½′	28° 7½′	32° 7′	35° 34′	38° 36′
$a-b$ ...	·0037916	·0037922	·0037927	·0037931	·0037939	·0037932	·0037936

The observations on the plate cut parallel to the axis gave—

ϕ	53° 58′	57° 11′	64° 45′	72° 13′	79° 53′	83° 40′	85° 37′
$a-b$ ...	·0037949	·0037947	·0037945	·0037944	·0037943	·0037946	·0037944

The observations were taken in the Cavendish Laboratory, Cambridge, during the months of March and June, 1885.

For full details as to the apparatus, the plates of quartz used, the mode of observation, the precautions necessary, the temperature effects, and the calculations, reference must be made to the paper.

EDINBURGH

Royal Society, December 7.—Mr. J. Murray, Ph.D., Vice-President, in the chair.—Sir W. Thomson read a paper on certain cases of motion of a liquid filling an ellipsoidal hollow; and a paper on the communication of motion from a liquid to a rigid containing shell. He showed that the motion of a liquid when rotating about the long axis of a prolate spheroid is essentially unstable, so that no great speed of rotation can be got up in the liquid in this case by making the containing shell rotate about the long axis.—Prof. Turner showed that the relative length and breadth of the sacrum may be taken as a test of development in different races of mankind. In the higher races the length exceeds the breadth.—Prof. Crum Brown read a paper on a case of interlacing surfaces. In this paper he extended the problem of the locking of threads to surfaces, pointing out that only certain surfaces can be covered over by such an interlacing system. For example, the sphere cannot be so covered, while the cylinder and anchor-ring can.—Prof. Tait communicated an elementary examination of the laws of collision of two systems of spheres, showing as clearly as possible what assumptions are necessary in obtaining average results, and how they are justified. The case in which one system of spheres gains energy from without, while the other loses to external objects, is investigated, and shows that the final average energy is not the same in the two systems, thus affording an escape from the difficulties raised by Botzmann's theorem.—In a second paper Prof. Tait defined the mean free path as the average of the free paths at any moment being described by all the particles. The definition, as usually given, is the average speed of a particle divided by the average number of collisions per particle per second. When the former definition is employed, the factor by which the mean free path is reduced in consequence of the motion of the other particles, is found to be 0·68 nearly, instead of 0·71 nearly, as found from the second definition.

Royal Physical Society, November 18.—Mr. B. N. Peach, the retiring President, delivered an address on some of the relations of Palæontology to Geology, illustrated chiefly by examples from the Scottish rocks.

December 16.—Prof. Duns, Vice-President, in the chair.—Prof. Turner, F.R.S., was elected President, and Mr. J. Harvie Brown, Prof. Duns, and Prof. Ewart were elected Vice-Presidents.—The Secretary read a paper by Mr. Robert Kidston, on the species of the genus Palæoxyris, occurring in British Carboniferous rocks.—A paper was read by Prof. Ewart, on the hatching of herring in deep water. Prof. Ewart pointed out that during recent years the herring-fishing had undergone marked changes in several respects:—(1) There had been a great increase in the "take." In 1820 only 450,000 barrels were cured, while in 1885 nearly 1,500,000 barrels were cured. (2) There had been a change in the fishing-ground; the greater number of the fish during the autumn are now caught from forty to sixty miles off shore. (3) The herring captured during the last few years off the east coast during the autumn were much smaller than those captured some ten years ago. The herring having, to a great extent, deserted the spawning-grounds in the Moray Firth, it was feared that the shoals might diminish in numbers, owing to the ova being unable to develop on the deep off-shore banks. A reference to the charts showed that the North Sea was, on the whole, very shallow—the fifty-fathom line running from fifty to thirty miles from the coast—and that there was only one small area (off Fraserburgh) where there was 100 fathoms of water. By depositing artificially-fertilised eggs in ninety-eight fathoms of water in Lochfyne, off Tarbert, it was proved that the ova develop normally, and that the only difference is one of time, the hatching being delayed owing to the lower temperature of the deep water. It was pointed out further that there was abundance of food for the fry in the off-shore waters of the Moray Firth, and that the fry, on the second day after hatching, were able to ascend at the rate of 100 fathoms in five hours.—A communication was read from Mr. A. Smith on the sucker fishes, Liparis and Lepadogaster.—Mr. Brook called attention to a peculiar method of cell-division in the early segmentation stages of fish ova. A series of vacuoles form in the plane of cleavage either at the surface or in the interior of the cell-protoplasm. By an increase in the size of these vacuoles, the two new cells become separated. Several cells may, however, remain connected together by bridge-like strands of the cell-plasma. This method of cell-division has been observed in Salmonidæ and Gadidæ, but most distinctly in the herring.—Mr. Gulland read a paper on the sense of touch in Astacus, in which he described the distribution and nature of the tactile setæ and their corresponding nerve end-organs, and discussed their origin and relations, and also the nature of certain glands in the great claw.

Mathematical Society, December 11.—Dr. R. M. Ferguson, President, in the chair.—Prof. Tait communicated a paper, which was read by Mr. William Peddie, on integrals occurring in the kinetic theory of gases. Mr. Peddie explained a method of breaking up a rectangle to form a square, and gave the first part of a paper on the theory of contours, and its application to physical science.

Sydney

Royal Society of New South Wales, September 2.—Prof. Liversidge, F.R.S., President, in the chair.—Mr. J. P. Josephson, A.M.I.C.E., read a paper on the history of the floods in the Hawkesbury. A number of chromogenic and pathogenic micro-organisms were exhibited and described by W. Camac Wilkinson, M.D. Lond.—An advanced copy of a work containing a series of photographs and descriptions of a case of variola occurring at the Quarantine Station was shown by Dr. J. Ashburton Thompson.—A number of microscopical slides, mounted without pressure, were shown by Mr. H. Sharp, of Adelong.

Paris

Academy of Sciences, December 21.—M. Jurien de la Gravière, Vice-President, in the chair.—Allocution on the progress of science during the past year, by the Vice-President.—Prizes awarded during the year 1885:—Geometry: Bordin prize to M. P. Appell (2000 fr.) and M. Otto Ohnesorge (1000 fr.); Francœur prize, M. Emile Barbier. Mechanics: Extraordinary prize of 6000 fr. to M. Hélie (2000 fr.) and MM. Hugoniot, Doneaud du Plan, Hatt, and Lucy (1000 fr. each); Poncelet prize to M. Henri Poincaré; Montyon to M. Amsler-Laffon; Plumey to MM. Bienaymé and Daymard; Dalmont to M. Lucas; Fourneyron to M. Colladon. Astronomy: Lalande prize to M. Thollon; Valz to M. Spörer; Bordin to M. Edlund; Lacaze to M. Gernez. Statistics: Two prizes to MM. de Pietra Santa and Keller. Chemistry: Jecker prize to MM. Prunier and Silva (4000 fr. each) and M. G. Rousseau (2000 fr.). Geology: Delesse prize to M. Lapparent. Botany: Barbier prize to MM. Dubois, Heckel, and Schlagdenhauffen; Desmazières to M. Leclerc du Sablon; Montagne to M. Patouillard. Anatomy and Zoology: Grand prize of the Physical Sciences to M. Joannès Chatin; Da Gama Machado to M. Girod. Medicine and Surgery: Montyon to MM. Charpentier, Farabeuf, Regnauld, and Villejean (2500 fr. each), Bréant to M. Mahé; Godard to M. Desnos; Lallemand to M. Grasset. Physiology: Lacaze prize to M. Duclaux; Montyon to M. Remy. Physical Geography: Gay prize to Capt. Defforges. General prizes: Montyon (industries injurious to the health) to MM. Girard and Chamberland (2500 fr. each); Cuvier to M. Van Beneden; Trémont to MM. Bourbouze and Sidot (1000 fr. each); Gegner to M. Valson; Petit d'Ormoy (Mathematical Sciences) to M Halphen; Petit d'Ormoy (Natural Sciences) to M. Sappey; Laplace to M. E. G. A. Coste.—Prizes proposed for the year 1886:—Geometry: A study of the surfaces admitting all the symmetrical planes of one of the regular polyhedrons (3000 fr.); Francœur prize, The work most conducive to the progress of the pure and applied mathematical sciences (1000 fr.). Mechanics: Extraordinary prize of 6000 fr. for any work tending most to increase the efficiency of the French naval forces; Montyon (700 fr.), Invention or improvement of instruments useful to the progress of agriculture, of the mechanical arts or sciences; Plumey (2500 fr.), Improvement of steam-engines, or any other invention contributing most to the progress of steam navigation; Dalmont (3000 fr.), The best work by any of the Ingénieurs des Ponts et Chaussées in connection with any section of the Academy. Astronomy: Laland prize (gold medal worth 540 fr.), for the most interesting observation on work most conducive to the progress of astronomy; Damoiseau (10,000 fr.), Best work on the theory of Jupiter's satellites, discussing the observations and deducing the constants contained in it, especially that which furnishes a direct determination of the velocity of light; Valz (460 fr.), for the most interesting astronomical observation made during the course of the year. Physics: Grand prize of the Mathematical Sciences (3000 fr.), for any important improvement in the theory of the application of electricity to the transmission of force. Statistics: A prize of 500 fr. for the best work on the statistics of France. Chemistry: Jecker prize (5000 fr.), for the work most conducive to the progress of organic chemistry. Geology: Vaillant prize, on the influence exercised on earthquakes by the geological constitution of a country by the action of water or of any other physical causes. Botany: Barbier prize (2000 fr.), for any valuable discovery in the medical and botanical sciences bearing on the healing art; Desmazières (1600 fr.), for the best or most useful work, by a Frenchman or a foreigner, on the cryptogamic plants. Anatomy and Zoology: Savigny prize (975 fr.), for the best work on the invertebrate animals of Syria and Egypt. Medicine and Surgery: Bréant prize (100,000 fr.), for an efficacious remedy against cholera,—discovery of the true causes of Asiatic cholera, with a view to its suppression, or for the discovery of any certain prophylactic against cholera. Physiology: Montyon prize (750 fr.), for the best work on experimental physiology. Physical Geography: Gay prize (2500 fr.), researches on the differences of sea-level in the vicinity of the continents due to local attraction or relief of the land, with examples illustrating the reality of this phenomenon. General prizes: Montyon prize, for any discovery useful to the healing art or tending to render unhealthy industries less injurious; Delalande-Guérineau prize (1000 fr.), for any French traveller or any naturalist who shall have rendered the greatest service to France or to science; Jerome Ponti prize (3500 fr.), for any work judged most useful for the advancement of science. Competitors for these prizes are reminded that all papers must be sent in before June 1, 1886, and that no documents will be returned by the Academy. Copies, however, may be procured through the Secretary.

Berlin

Physiological Society, Nov. 13.—Prof. Munk reported on experiments carried out by Dr. Ziehen in his laboratory, with a view to deciding the question whether epileptic convulsions, artificially induced by electric stimulation of the brain, proceeded from the cerebral cortex or from centres of deeper situation. By weak electric stimulation of a motory region of the cortex continued for a longer time, or by a stronger stimulation for a shorter time, it was found, after removing the electrode, that convulsions originated in the muscles corresponding with the stimulated region, thence propagating themselves gradually over the whole body. After the stimulation of one region of the cortex, a cause of convulsion was accordingly left in it, gradually overtaking the other centres of the groups of muscles. The question was, whether this propagation of the cause of convulsion took place in the cortex, where, map-like, were situated, adjacent to each other, the regions for the muscles of the eyes, ears, face, anterior and posterior extremities—or whether the propagation got transferred directly to the deeper centres of the muscle sections, gradually taking possession of them. This problem Prof. Luciani endeavoured to solve by exciding a centre of muscle groups out of the cortex, such as that of the anterior extremity, and then causing the convulsive fit artificially. The result he found was that all the muscles gradually fell into a state of convulsion, with the exception of those of the anterior extremity. This experiment, apparently settling the question, had been confirmed by some physiologists, but not by others, so that it became necessary to institute experiments afresh. Dr. Ziehen had now made the observation that under sufficiently long application of weak stimulations the convulsion ensuing and gradually spreading over the whole body was a clonical one, and that under moderately strong stimulation tetanic allied themselves to the clonical spasms, while under very strong stimulations the tetanic contractions preponderated. When, in accordance with Prof. Luciani's procedure, he had excided a region of the cortex and then applied stimulation by weak currents, the clonical spasms showed themselves in all groups of muscles, with the exception of those corresponding with the excided portion of the cortex. When, on the other hand, he applied stimulation by strong currents, he observed the tetanic convulsions assert themselves at those parts likewise of the body, the cortex region of which had been excided, even if weaker at this latter part than in the other muscles. From this result the speaker inferred that the spasmodic stimulation, in the case of clonical contractions, propagated itself in the cortex, and that in the case of tetanic contractions the spasmodic stimulation propagated itself in the deeper parts of the brain. In support of this inference Prof. Munk adduced the succession of the groups of muscles overtaken by spasm. The position of the motory centres in the cortex was precisely known, whereas the local distribution of the deeper centres was unknown. Now, the clonical spasms proceeding from the spot of excitation followed each other precisely in that succession in which the centres of the cortex arranged themselves conterminously, while the succession of tetanic spasms formed a different and irregular series. Further evidence in support of the conclusions just stated was afforded by the following experiment. A region of the cortex having been stimulated by weak currents sufficiently long to induce clonical spasms in the muscles corresponding therewith, and in the muscles belonging to the adjacent region, the part of the cortex first affected was excided. The consequence was that the spasm now propagated itself no further, but ceased entirely. In the case, however, of tetanic spasms, the excision of the stimulated part of the brain had no effect. In refutation of the objection that might possibly be urged, namely, that in the main experiment the excision of a determinate part of the cortex was followed by an exemption from spasms in the group of muscles belonging to that part, for the reason that the excision caused a stimulation which induced a counteracting excitation in the muscles in question, Prof. Munk adduced the fact that he had observed the same result in animals that had been tested in this manner eight months after the excision, when there could no longer be any question as to a stimulation in the part where the excision had been made.—Prof. H. Munk next communicated the observations he had made on pigeons from which he had cut out the corpora striata. The conditions in respect of the corpora striata were very different in birds from those obtaining in Mammalia, seeing that in the brain of birds the corpora striata composed the main mass, whereas in the brain of the Mammalia they retired considerably into the background. If these were now removed on both sides from pigeons, the pigeons yet acted altogether normally, and the functions of all their senses continued unimpaired. With careful attention for a length of time three deviations from the normal state could yet, however, be remarked. The back of the pigeons was curved strongly convex; they never perched either by day or by night; and could never snap up a pea, however much exactness they showed in pecking at any pea laid before them, seeing that in pecking they never opened the beak. The animals had therefore to be fed artificially. In consequence of these observations Prof. Munk conjectured that the corpora striata were the seat for the combination of movements.—Following up this subject Dr. Lehmann stated some provisional results which, in conjunction with Dr. Baginski, he had found in rabbits, in which the corpora striata had been injured. The phenomena resulting under like conditions in pigeons had not been observed. The investigation in this field was still being continued.—Prof. Liebreich gave a short sketch of a series of investigations which had engaged him for some years, and had led to the introduction of a new substance into the pharmacopœia. He premised that the denomination "fats" would have to cover more than it had hitherto done, and not merely such substances as were capable of decomposition in fatty acids and glycerine. All substances, on the contrary, would have to be conceived of as neutral fats, which contained sebacic acids, no matter with what organic base these were combined. Such a neutral fat was discovered by Herr E. Schulze, in 1869, in the yolk of the fleece of sheep, and which consisted of a sebacic acid and cholesterine. This cholesterine fat of sheep's wool, or "lanoline," had been studied by Prof. Liebreich, as to the method of obtaining it on account of its excellent qualities in the way of a salve constituent; it was now being extracted from woollen hairs by means of a centrifugal machine and had become an article of trade. Prof. Liebreich had next investigated the origin of this cholesterine fat, and, with the help of the uncommonly sensitive cholestol reaction of Prof. Liebermann, had come to the conclusion that the cholesterine fat contained in the yolk of sheep was derived neither from the sudorific glands nor from the sebaceous glands, nor from the sebaceous texture of the under-skin, but was seated exclusively in the hairs and in the epidermis cells. This fact led, on the one hand, to the production of the substance as a kind of manufacture, while on the other hand it induced a very extensive series of experiments respecting the distribution of cholesterine fat in the animal kingdom. The speaker found it in the epidermis, the hairs and nails of men, in the hairs of all Mammalia he had examined, in the hoofs of horses, in the paws of swine, in the horns of cattle, in the prickles of the hedgehog, in the feathers of fowls, geese, and a large number of other birds, in the plated sheaths of the tortoise; in short, in all horned textures which, with long and toilsome labour, he had examined. The speaker had, in addition, found the cholesterine fat in the kidneys and the liver of Mammalia; yet it was not beyond question that in these organs the cholesterine fat did not proceed from the blood, in which it was always present in small quantities. It might be conjectured that it would likewise be found in the intestinal canal, and generally wherever epithelial cells occurred. The constant presence in all epithelial formations of a particular fat, which was there formed in the keratine cells, rendered it highly probable that the hairs of the Mammalia and the feathers of birds owed their elasticity and pliancy not, or at all events not exclusively, to the secretion of the sebaceous or caudal glands, but to the cholesterine fat generated in the horn cells themselves. The quality possessed by cholesterine fat of not oxidising, or oxidising only under very rare conditions, rendered it, as was very readily conceivable, most peculiarly adapted for lubricating the skin and feathers. Beyond the property of not becoming rancid, lanoline possessed a whole series of other advantages distinguishing it quite peculiarly as a salve constituent. It absorbed, for example, 100 per cent. of water, and by so doing became a soft substance easy to the touch, penetrating the skin with altogether extraordinary facility, and after but a short rubbing into the cutis, disappeared from view. Prof. Liebreich had already prepared into salves a great number of medicamental stuffs by means of "lanoline," and had made experiments with them which yielded entirely satisfactory results. Lanoline, dark brown in a dry state, grew pale like wax in light, and showed other qualities besides assigning it a place between the ordinary glycerine fats and the wax kind of fats.

STOCKHOLM

Academy of Sciences, November 11.—The following papers were read and accepted for publication in the Society's *Journal*:—Lois de l'équilibre chimique dans l'état dilué, gazeux, ou dissous, by Herr J. H. van't Hoff.—Recherches sur les réactions chimiques dans le champ du microscope, by Prof. E. G. Fatigoti, of Madrid.—Some remarks and experiments on filtration, with reference to its bearing upon the process of transudation in the animal body, by Drs. R. Tigerstedt and G. Santesson.—*Hæmatodeptes terebellidis*, une nouvelle Annélide parasitique de la famille des Euniciens, by Prof. A. Wirén.—On the constitution of some derivatives of naphthaline, by Dr. A. G. Ekstrand.—On combinations of phenyl-textra-zol, by Herr J. A. Bladin.—On the integration of the differential equations of the intermediate orbits, by M. C. V. L. Charlier.

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